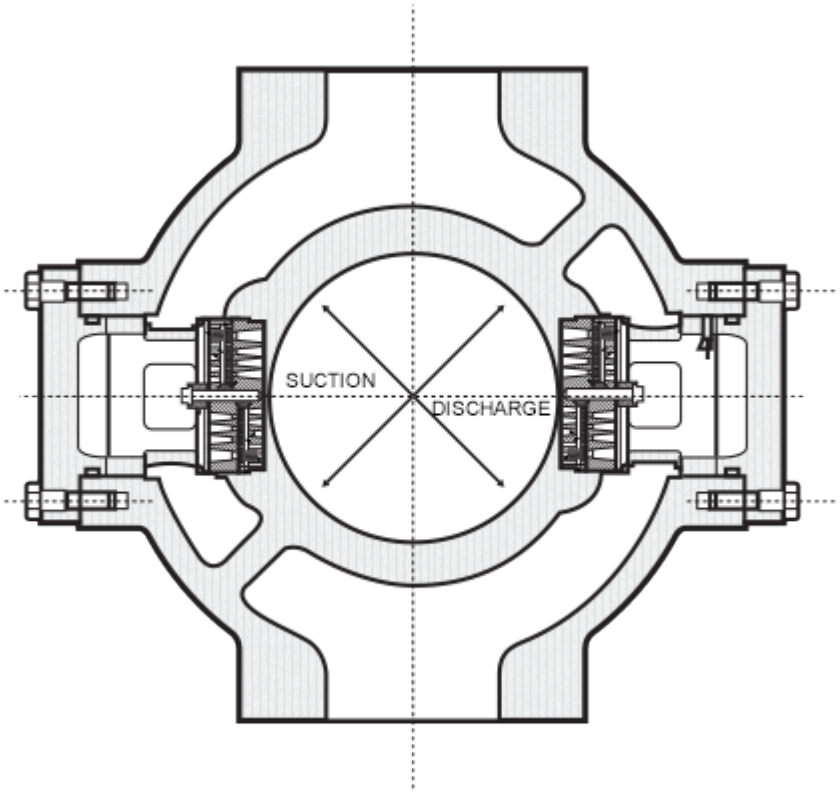
Cylinder, Design Features

Ariel cast cylinders are single and double wall castings. Materials include nodular iron for the greater majority of cylinders, cast iron for a very few of the smaller models and forged steel for the higher pressure ratings. The cylinders on the mid and larger frame classes are ion nitrided to harden the bore for wear resistance. The case cylinders on the smaller frame classes are made from 80-55-06 ductile iron for the harder surface for wear resistance.

Water Jackets

Ariel cylinders are provided without water jackets. Water jackets were originally used to maintain the dimensions of cylinder bores with longer piston strokes and more complicated casting geometry. Shorter stroke cylinder designs combined with casting quality allow the use of non-jacketed cylinders while maintaining stable bore geometry. Despite the misconception, water coursing through the cylinder passages does not have an appreciable effect on the bore temperature and does not impact wearing component life.

Figure: Ariel Cylinder Cross-Section



Cylinder Liners

All ASTM A395 ductile iron cylinder bores are surface hardened with an ion-nitride process to increase cylinder bore wear resistance. Ion nitride surface hardening is provided in lieu of providing a sacrificial wear part (liner). Should a cylinder bore become damaged beyond the re-bore capability, a replacement can be provided. Since Ariel cylinders are non-jacketed (simpler casting geometry), the downtime and cost of a replacement cylinder is generally lower than the downtime and cost of removal and re-installation of a cylinder liner.

ASME Section VIII Pressure Vessel Design

Ariel cast cylinders are designed and pressure rated based on guidelines from Section VIII, Division 1, of the ASME Pressure Vessel Code. Although compressor cylinders categorically cannot be ASME Code stamped, Section VIII, Division 1 of the ASME Pressure Vessel Code provides consistent design and pressure rating methods. Please contact Ariel Design Engineering for a description of the methods applied.

Cylinder Re-Bore Capability

Ariel cylinders may be rebored within limits. A bore restoration guideline is available from Ariel upon request.